The Impact of Personal Bankruptcy Law on Entrepreneurship

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Personal bankruptcy and entrepreneurship

- Personal bankruptcy is important for small businesses:
  - 78% businesses are sole proprietorships in the U.S., 82% in Europe.
  - Most loans for small corporations are backed by personal guarantees.

- How does personal bankruptcy affect entrepreneurship

  Insurance effect debt discharge in the event of business failure;
  Borrowing cost effect intermediaries charge default premium.

- Questions (quantitatively):
  - How does personal bankruptcy law matter for
    1. Level of entrepreneurship (How many);
    2. Quality of entrepreneurs (Who becomes one);
    3. Entry/Exit;
    4. Output;
    5. Welfare.

Personal bankruptcy laws and entrepreneurship

	US (Ch7)	Canada	UK	Germany	France
income garnishment	None	9m	3y	6y	8-10y
income exemption	None	$21,000	"reasonable needs"	$21,000	$20,000
% garnisheed	None	50%	30-50%	85%-100%	90-100%
asset exemption	very high	high	low	very low	very low

Source: White (2007) *JEP*

	US (Ch7)	Canada	UK	Germany	France
manager-owner / adult-population	10.6%	9.7%	8.8%	7%	4.2%

Source: GEM (2004)

1. Large differences in personal bankruptcy regimes and level of entrepreneurship across developed countries;
2. Positive correlation between the leniency of regime and the level of entrepreneurship.
3. Question: which aspect of bankruptcy regime matters more?

What I do

- Quantitative life-cycle model where households with different entrepreneurial abilities choose between work and entrepreneurship given a bankruptcy regime
- Calibrate model to match key facts of US economy
    - Entrepreneurs - level, return on assets
    - Bankruptcy - level, cause
- Counterfactuals: different bankruptcy regimes:
    1. Vary duration of punishments;
    2. Vary percentage of income garnisheed;
    3. Regimes resemble other countries' personal bankruptcy law.
       i.e: What would happen to the U.S. if they adopted other countries' personal bankruptcy law.

Features of the Model

1. Household heterogeneity in entrepreneurial ability:
   - higher ability – more likely to succeed, less likely to fail;
   - lower ability – less likely to succeed, more likely to fail.

2. Complete information:
   - intermediaries sees all available information;
   - interest rate is based on default probability;

3. Bankruptcy:
   - liquidation of business assets;
   - garnishment of post-bankruptcy incomes;
   - transaction cost;
   - exclusion from credit market;
   - cannot run a business.

Main Mechanism

1. More lenient regimes encourage risky (moderate ability) households to participate in entrepreneurship
   - insurance effect dominates.

2. Variation in bankruptcy regime has little impact on high ability households' choices
   - less likely to fail, both insurance and borrowing cost effects are small.

3. More lenient regimes lead to smaller firms and more entry/exit.
   - Selection – smaller fraction of high ability entrepreneurs;
   - Entrepreneurs are more borrowing constrained.

Main Findings

- Insurance effect dominates borrowing cost effect for extensive margin of entrepreneurship;

- Post-bankruptcy punishment has larger impact than asset exemption;

- More lenient bankruptcy code leads to:
  1. a higher level of entrepreneurship;
  2. increased entry of moderate ability entrepreneurs;
  3. more entry/exit;
  4. lower average size of firms.

- More lenient regime lead to higher overall output;

- Welfare
  - Entrepreneurs prefer more lenient regimes;
  - Worker prefer less lenient regimes.

Literature

- Macroeconomic model of entrepreneurship:
  Cagetti & De Nardi (2006)

- Entrepreneurship and personal bankruptcy:
  - Akyol & Athreya (2009) Meh & Terajima (2008)
    Herranz, Krasa & Villamil (2007) Mankart & Rodano (2009)
  - Berkowitz & White (2004) Armour & Cumming (2008)

- Consumer Bankruptcy:
  Livshits, MacGee and Tertilt(2007)
  Chatterjee, Corbae, Nakajima & Ríos-Rull (2007)
  Athreya (2008)

Literature abstract from 2 key points:
- differences in entrepreneurial abilities (span of control);
- variation in treatment of post-bankruptcy income.

Model Setup

J periods lived agents, with preference represented by:

$$E_0 \sum_{j=1}^{J} \beta^{j-1} u(c_j)$$

- Each period households can choose between
  1. work in corporate sector for wage: income depends on labor productivity shock ϵ_j^i and deterministic average life-cycle profile, $\bar{y}_j$

  $$y_j^i = \epsilon_j^i \bar{y}_j \quad \text{where} \quad \epsilon_j^i = z_j^i \eta_j^i$$

  z_j^i: persistent shock η_j^i: transitory shock

  2. operate own business: return is $F(k, \theta_j^i) = \theta_j^i k^\alpha + (1-\delta)k$
     - Stochastic business productivity shock θ_j^i;
     - **Distribution of θ depends on permanent ability level ρ;**

Financial Intermediation

1. Borrowing and saving via one period non-contingent bond, denoted d. $d > 0$ denotes borrowing, $d < 0$ denotes saving;

2. Perfect competitive intermediaries make zero expected profit on each loan;

3. Intermediation cost: fraction τ per unit loan;

4. No information asymmetry: intermediary sees age j, labor shock ϵ, ability level ρ, total borrowing d' and total capital k'.

Bankruptcy

Households have option to declare bankruptcy $b \in \{0, 1\}$

Income garnishment: current and G periods following, at rate γ above exemption level $\bar{w}$;

Liquidation of assets: business assets above exemption level $\bar{x}$ are seized by creditors for liquidation, liquidation cost is ζ;

Transaction cost: lose fraction λ of consumption during bankruptcy and garnisheeing period;

Exclusion from entrepreneurship: cannot run a business during bankruptcy and garnisheeing periods;

Exclusion from credit market: bankrupts cannot borrow during the bankruptcy and garnisheeing periods.

Loan Pricing

Given that the expected profits on each loan is zero,
the discounted bond is priced according to:

$$q^d(S_j^i) = [1 - \phi(S_j^i)]\bar{q}^d + \phi(S_j^i)E[\frac{\Gamma(S_j^i)}{d'}|b = 1]\bar{q}^d$$

price of loan = prob of not default × risk free rate +
Prob of default × rate of recovery × risk free rate

$S_j^i = (d', k', \epsilon, \rho, j)$

ϕ is the endogenous probability of defaulting in next period

$\bar{q}^d = \frac{1}{1+r+\tau}$ is the risk free lending rate

Γ is the expected amount of recovery from a bankrupt household.

Benchmark Parameterizations

Demographic	$J = 57$, 45 periods working and 12 periods of retirement	Average life span of 77
Preference	CRRA, $\beta = 0.96$, $\sigma = 2$	Livshits, MacGee & Tertilt (2007)
Labor income process:	z follows AR(1) with $\rho_z = 0.99$, and $\sigma_\xi = 0.007$, transitory shock: $\sigma_\eta = 0.043$	Livshits, MacGee & Tertilt (2007)
Intermediation	$r = 4\%$, $\tau = 3\%$	Livshits, MacGee & Tertilt (2007)
Depreciation	$\delta = 8\%$	Meh & Terajima (2008)

Calibration

Moments	Source	Data	Benchmark	Parameters
Fraction of Entrepreneurs	GEM Survey	10.6%	10.71%	$\alpha = 0.641$ return to scale
Overall annual bankruptcy rate (job loss+business failure)	PSID, Bankruptcy.com	0.378%	0.391%	$\lambda = 15\%$ transaction cost $\gamma = 43.3\%$ % garnishment
Fraction of Entrepreneurs declare bankruptcy	PSID, Bankruptcy.com GEM	1.66%	1.69%	λ transaction cost γ % garnishment θ productivity
Mean of ROA	Herranz, Krasa and Villamil (2009)	1.30	1.313	θ productivity α return to scale
StDev of ROA		1.575	1.612	

Results

1. More lenient regime encourages moderate ability households to participate in entrepreneurship;

2. Variation in post-bankruptcy garnishment much more important than variation in asset exemption.

3. More lenient bankruptcy code leads to:
   1. a higher level of entrepreneurship;
   2. increased entry of moderate ability entrepreneurs;
   3. more entry/exit;
   4. lower average size of firms.

Variation in Length of Garnishment

Increase in G:

- $\downarrow$ entrepreneurs, $\uparrow$ firm size, $\uparrow$ productivity, $\downarrow$ entry/exit

% of garnishment=43.3%   asset exemption=0.9($50,000)   income exemption=0

G	1	3	6	9
% Entrepreneurs	10.71	9.63	8.47	7.32
Average size	15.23	16.04	17.47	19.21
Ave productivity	1	1.03	1.05	1.07
Entry/Exit %	5.21	4.92	4.09	3.55
% Entrepreneurs/ρ_1	0	0	0	0
% Entrepreneurs/ρ_2	0	0	0	0
% Entrepreneurs/ρ_3	0.025	0.004	0	0
% Entrepreneurs/ρ_4	21.97	16.2	11.5	4.7
% Entrepreneurs/ρ_5	62.9	61.4	61.7	63.8

Overall Production

1. More lenient regime $\Rightarrow$ more entrepreneurs $\Rightarrow$ higher output
   - Risk-averse household run business only if
     $E[(1 - \phi)(\theta k^\alpha + (1 - \delta)k)] - \frac{k}{\bar{q}^d} > E(w)$
     i.e: expected return from operating a business must be much higher than expected wage income.

2. More lenient regime: drop in average firm size not enough to offset the increase in level of entrepreneurship.
   - extensive margin: more entrepreneurs;
   - intensive margin: smaller firms
     - moderate ability households operate smaller firms;
     - entrepreneurs are more borrowing constrained.
   - extensive margin effect larger than intensive margin effect.

Benchmark and Counterfactuals

Regimes	1(US)	2 (CA)	3 (UK)	4 (GE)	5 (FR)
G	1	1	3	6	9
% entrepreneurs	10.71%	9.75%	9.1%	7.32%	6.43%
average size	15.23	16.07	17.23	18.43	19.78
% entry/exit	10.42%	9.94%	8.64%	7.54%	6.98%
DATA					
% manager-owner	10.6%	9.7%	8.8%	7%	4.22%
less than 20 employees	88%	86.7%	N.A	N.A	82%
with zero-employees	77.3%	58.2%	69.3%	N.A	N.A
entry/exit rate	12%/10%	11%/10.5%	N.A	6%/6%*	11%/7.5%

Welfare

From less lenient to more lenient regimes:

- Overall welfare decreases;
- Pure worker type prefer less lenient regime
  -care more about borrowing cost effect;
- HH more likely to become entrepreneur prefer more lenient regime
  - care more about insurance;

Conclusion

- Personal bankruptcy law is an important determinate of a country's entrepreneurial sector:

  1. Percentage of population being entrepreneurs;
  2. Aggregate and sector productivities;
  3. Entrepreneurial firm size distribution;
  4. Entry/Exit

- Main mechanism is insurance effect (impact on the extensive margin)
  - Borrowing cost effect quantitatively small;

- Variation in regime have different effect on households with different abilities:

  1. High ability households are less affected;
  2. Moderate ability households care more about insurance effect;
  3. Low ability households prefer less lenient regimes.